

Claims

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5 1. A pleated filter cartridge for removing particulates from liquid of the type including a perforate core, a pair of endcaps, and an annular filter element around the core formed by substantially axially-parallel pleats of at least one sheet of filter material, the filter element having opposite ends each in sealing engagement with one of the endcaps, characterized in that the filter material is a non-perforated non-woven material of flash-spun plexifilamentary high-density polyethylene fibrils, the filter material having a pressure drop of less than 4 psid at a flow rate of 10 gal/hr and a
10 filtration efficiency of at least 98% of 1-2 micron particulates at a pressure differential of 30 psid.

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15 2. The pleated filter cartridge of claim 1 wherein the filter material has a pressure drop of less than about 1.5 psid at a flow rate of 10 gal/hr and the filtration efficiency is at least about 99% of 1-2 micron particulates at a pressure differential of 30 psid.

20 3. The pleated filter cartridge of claim 2 wherein the mean flow pore size of the filter material is greater than 4 microns while its nominal pore-size filtration rating is 1 micron.

4. The pleated filter cartridge of claim 2 wherein the filter material has a Gurley Hill porosity rating no greater than about 5 sec/100cc.

25 5. The pleated filter cartridge of claim 1 wherein the filter material has a thickness of less than about 0.15 mm.

30 6. The pleated filter cartridge of claim 5 wherein the filter material has a thickness less than or equal to about 0.13 mm.

7. The pleated filter cartridge of claim 1 wherein the filter material has a basis weight of less than about 45 g/m².

5 8. The pleated filter cartridge of claim 7 wherein the filter material has a thickness of less than about 0.15 mm.

9. The pleated filter cartridge of claim 8 wherein the filter material has a thickness less than or equal to about 0.13 mm.

10 10. The pleated filter cartridge of claim 1 wherein the filter element has at least two layers, including a mesh layer with the filter material.

11. The pleated filter cartridge of claim 10 wherein the mesh layer is between the filter material and the core.

15 12. The pleated filter cartridge of claim 11 wherein a single layer of the filter material serves as the sole filtering layer.

20 13. The pleated filter cartridge of claim 10 wherein the mesh layer is a low-density polyethylene.

25 ~~14. The pleated filter cartridge of claim 13 wherein the polyethylene mesh has a softening temperature range lower than the lower end of the softening temperature range of the high-density polyethylene filter material and is tack-point interconnected to the filter material without having compromised the filter material.~~

15. The pleated filter cartridge of claim 14 wherein the mesh layer and filter material were tack-point interconnected prior to pleating.

30 ~~16. The pleated filter cartridge of claim 14 wherein the mesh layer and filter material were tack-point interconnected after pleating.~~

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17. The pleated filter cartridge of claim 14 wherein the softening temperature range of the polyethylene mesh is within the range of about 170-195° F.

18. The pleated filter cartridge of claim 10 further including a containment sleeve of polyethylene netting enclosing the annular filter element.

19. The pleated filter cartridge of claim 18 wherein the core and the endcaps are of polyethylene.

20. The pleated filter cartridge of claim 1 further including a containment sleeve of polyethylene netting enclosing the annular filter element.

21. The pleated filter cartridge of claim 20 wherein the core and the endcaps are of polyethylene.

22. The pleated filter cartridge of claim 1 wherein a single layer of the filter material serves as the sole filtering layer.

23. An annular pleated filter element for removing particulates from liquid formed by substantially parallel pleats of at least one sheet of filter material and a mesh layer of a low-density polyethylene, wherein the filter material is a non-perforated non-woven material of flash-spun plexifilamentary high-density polyethylene fibrils, the filter material having a pressure drop of less than 4 psid at a flow rate of 10 gal/hr and a filtration efficiency of at least 98% of 1-2 micron particulates at a pressure differential of 30 psid.

24. The annular pleated filter element of claim 23 wherein the polyethylene mesh has a softening temperature range lower than the lower end of the softening temperature range of the high-density polyethylene filter material and is tack-point interconnected to the filter material without having compromised the filter material.

25. The pleated filter cartridge of claim 24 wherein the mesh layer and filter material were tack-point interconnected prior to pleating.

5 26. The pleated filter cartridge of claim 24 wherein the mesh layer and filter material were tack-point interconnected after pleating.

27. The annular pleated filter element of claim 24 wherein the softening temperature range of the polyethylene mesh is within the range of about 170-195° F.

10 28. The pleated filter cartridge of claim 23 wherein the filter material has a thickness of less than about 0.15 mm.

29. The pleated filter cartridge of claim 28 wherein the filter material has a thickness less than or equal to about 0.13 mm.